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ABSTRACT

The computer anxiety of 116 randomly selected secondary technical education teachers from 8 area vocational-technical centers in West Virginia was the focus of a study. The mailed questionnaire consisted of two parts: Oetting's Computer Anxiety Scale (COMPAS) and closed-form questions to obtain general demographic information about the teachers and their computer usage. Data analysis included descriptive statistics, calculation of correlation coefficients between computer anxiety and independent variables, and stepwise multiple regression. The distribution of scores suggested that some secondary technical education teachers (46 percent) experienced some overall computer anxiety. No differences existed between the computer anxiety levels of males and females. Over 45 percent considered themselves to be either complete beginners or novices. The most frequent type of formal computer instruction was inservice training workshops. The majority of teachers perceived local and state administrative support for computer use. The regression analysis revealed two significant explanatory variables: teacher's level of computer skills and perceived typing skills explained a substantial proportion of the variance in teachers' overall COMPAS scores. Recommendations included more hands-on experience for teachers and computer training relevant to teachers' major program area. (Contains 12 references and five data tables.) (YLB)

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ANALYSIS OF THE COMPUTER ANXIETY LEVELS OF SECONDARY TECHNICAL EDUCATION TEACHERS IN WEST VIRGINIA

by

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INTRODUCTION

While some secondary technical education teachers have shown an interest in the hi-tech computer revolution, others resist. As a result some secondary technical education teachers may be experiencing a fear of computers which has been termed computer anxiety or computerphobia.

Oetting (1983) defined computer anxiety as "the anxiety that people feel they will experience when they are interacting with computers--the anxiety associated with the concept of computers" (p. 1). Mauer and Simonson (1984) had a similar definition. These researchers defined it as "the irrational fear or apprehension felt by an individual when using computers or when considering the possibility of computer utilization" (p. 2).

RELATED LITERATURE

Several demographic variables and their relationship to computer anxiety have been cited in the computer anxiety related literature. Johassen (1985) found that computer anxiety was slightly lower in males than females. However, Winkle and Matthews (1982) suggested that women fear computers more because their socialization makes them less receptive to computers. Oetting's (1983) research using computer anxiety scale (COMPAS) does not distinguish between females and males. Oetting was convinced that females and males were equally involved in an increasingly computerized society. While the sexes may very well differ in their reactions to anxiety and stress, an equivalent high scale on COMPAS would mean that they are experiencing the same level of anxiety (Oetting, 1983).

Using Oetting's COMPAS with Louisiana vocational secondary teachers, Kotrlik and Smith's (1988) findings supported Oetting's (1983) theory. They found no statistical difference between the overall computer anxiety levels of female and male teachers.

Johnson (1987) studied the effects of computer training on levels of writing apprehension and computer anxiety in elementary school-teachers. Mauer and Simonson's "Computer Anxiety Index" was used in this research. Gender proved to be unrelated; however, age was found to be correlated positively with computer anxiety.

As early as 1970, Whisler stated that an individual's perception of computers may depend on whether the individual views the computer as a competitor, cooperator, or a powerful friend. Personnel at higher levels usually accepted computer technology and the development of new skills more favorably than those in lower positions of an organization. Whisler concluded that it could be attributed to one's position in an organization, one's age, or one's area of expertise. Porat and Vaughn (1967) stressed that younger professionals tend to view the computer more positively than the older staff members, except for administrators.

Kotrlik and Smith (1988) found no statistical difference between the computer anxiety levels of Louisiana agricultural vocational educators and other vocational teachers in home economics, business and office, and industrial arts education. In the multiple regression analysis, five variables explained 45% of the variance in the COMPAS score. Teachers with no or low levels of computer skills, teachers who perceived they had low math ability, and teachers without formal computer training were more likely to have higher levels of computer anxiety.

Maurer and Simonson (1984) listed some behaviors that are associated with the acceptance of computer technology: avoidance of computers and the area in which they are located, excessive caution, negative remarks, and attempts to cut short the necessary use of computers.

Another problem associated with computer technology is employee acceptance. The literature shows that the use of computers will increase; however, the path to employee acceptance will not be easy (Richardson, 1984).

A review of the previous studies and related literature revealed that there is a paucity of studies which have addressed computer anxiety levels of secondary technical education teachers.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the factors related to the computer anxiety levels of secondary technical education teachers in West Virginia.

The objectives of this study were to:

1. Determine the computer anxiety levels of secondary technical education teachers as measured by Oetting's Computer Anxiety Scale (COMPAS).
2. Determine if a difference exists between the levels of computer anxiety experienced by male and female secondary technical education teachers.
3. Describe secondary technical education teachers concerning:
   (a) their level of computer use and their current computer skill levels;
   (b) the available and use of an office computer;
   (c) the amount and type of formal computer training completed, and their perceptions of administrative support for computer use.
4. Determine the amount of variance in the secondary technical education teachers' computer anxiety levels that could be explained by selected variables. The variables included in this analysis were: major program area, level of education, teaching experience, age, sex, perceived typing skills, location of school, teacher's level of computer skills, hours of computer use per week, formal computer

training, administrative support, perceived mathematical ability and perceived verbal ability.

SIGNIFICANCE OF THE STUDY

Computer anxiety levels of secondary technical education teachers may be an important consideration in the process of incorporating computers into technical programs. If the level of computer anxiety being experienced and the factors related to computer anxiety can be identified, then steps can be taken during the planning of preservice and inservice education to alleviate these problems.

RESEARCH PROCEDURE

Population and Sample

The population for this study consisted of all secondary technical education teachers in West Virginia during the school year 1992-1993. According to their geographic characteristics, a total of 8 area vocational-technical centers were selected randomly from the eastern, western, northern, and southern regions. All secondary technical education teachers from the 8 randomly selected area vocational-technical centers constituted the sample of this study.

Instrumentation

A mailed questionnaire was considered the most appropriate instrument to gather data for this study. The instrument consisted of two parts. Part I was Oetting's Computer Anxiety Scale (COMPAS). Part II consisted of closed-form questions designed to obtain general demographic information about the teachers and their computer usage.

COMPAS (short form) was used because the researcher's objective was to measure computer anxiety. The short form consists of Likert-type items for which respondents report their subjective feelings of anxiety. The overall computer anxiety scale range was 10 to 50. The respective ranges and

classification were 10-19, very relaxed/confident; 20-26, generally relaxed/comfortable; 27-32, some mild anxiety present; 33-36, anxious/tense; and 37-50 very anxious.

Oetting (1983) stated there are three types of anxieties: trait, state, and concept-specific anxiety. Oetting defined trait anxiety as "anxiety experienced by a person over the entire range of life experiences. State anxiety ... is an anxiety that a person is experiencing right now, at this time" (p. 1). Concept-specific anxieties, on which COMPAS is based, "fill the range between general trait anxiety and state anxiety. They are anxieties that people associate with specific situations" (p. 1).

COMPAS was reviewed by psychologists, Benjamin Kleinmuntz and Steven Wise. Even though Kleinmuntz questioned the importance of measuring computer anxiety, both reviewers indicated that if one wishes to measure computer anxiety, COMPAS is the test to use (Mental Measurements Yearbook, 1985). Using Cronbach's alpha, Oetting (1983) calculated the overall internal consistency reliability as r=.88 for the short form.

The short form of COMPAS was utilized in this study because the testing time was limited. According to Oetting (1983) the total score on the short form correlates very highly (r=.96) with score on the long form, but no subscale scores can be obtained. A license to reproduce Oetting's Computer Anxiety Scale (COMPAS) for research purposes only, was obtained by the researcher on March 1, 1992.

The instrument's content validity was assessed by a panel of teacher educators and vocational directors throughout the state of West Virginia. The purpose of this review was to determine whether the content of the instrument was appropriate for the objectives of the study. The validation panel agreed

that COMPAS was a suitable instrument for the researcher to use in measuring the computer anxiety levels of secondary technical education teachers in West Virginia.

Data Collection

Before the instrument was sent to the selected sample schools, directors/principals in those schools were contacted by phone and asked to coordinate this study in their schools. After permission to survey in the schools was received, a complete set of questionnaire packages was distributed to the directors/principals at the 17th Annual Technical and Adult Education Conference. This conference was held on August 5-7, 1992 at Charleston, West Virginia. The directors/principals were requested to distribute the instrument to all secondary technical teachers in their schools. Each teacher was asked to mail the questionnaire directly to the researcher within three weeks after the beginning of the Fall term (1992-1993).

A follow-up mailing ensured high return. As a result, the final usable responses totaled 116, for a return rate of 91%. Because of the high response rate, a planned telephone follow up of non-respondents was not conducted. Borg (1983) claims that a follow up is not necessary if the response rate is over 80%.

ANALYSIS OF DATA

The alpha was set at .05 priori. Descriptive statistics were used to describe the data relative to computer anxiety level, demographic information, and computer usage. Correlation coefficients were calculated between computer anxiety and each independent variable. Stepwise multiple regression (Borg & Gall, 1993) was used to determine the amount of variance in the teachers' computer anxiety levels that could be explained by selected variables.

Objective 1

Objective one was designed to determine the computer anxiety levels of secondary technical education teachers as measured by Oetting's Computer Anxiety

Scale (COMPAS). Table 1 presents a breakdown of the computer anxiety scores of teachers by anxiety levels.

Insert Table 1 about here

The scores ranged from a maximum of 50 to a minimum of 10. The COMPAS score for the sample was 25.61 (SD = 10.84). Less than half of the respondents (46%) may be experiencing some computer anxiety at the levels COMPAS depicts as "some mild anxiety present, anxious/tense or very anxious".

Objective 2

Table 2 displays a comparison of computer anxiety by sex. No differences existed between these two groups on their overall scores.

Insert Table 2 about here

Objective 3

Over three-quarters (80%) of the respondents indicated that they used a computer. The largest percentage of the responding teachers, 47%, considered themselves as novices with much to learn about computer usage. Eighty-six percent of the respondents indicated that they had an office computer available to use. Teachers reported using the computer at a mean rate of seven hours weekly.

Three-quarters of the teachers had completed some type of formal computer training. The most reported type was an in-service training workshop. Sixty-five percent of the responding teachers had participated in this type of activity. One-third of the responding teachers had completed 25-60 hours of formal computer training.

Respondents were asked to indicate their perception of administrative support at two different levels -- local and state. Responses were recorded on a five point Likert-type scale ranging from one (strongly disagree) that support was received to five (strongly agree). Over half (57%) of the respondents felt that their local administrators support computer use. A slightly lower percentage of teachers (54.4%) revealed they perceived their state administrators to be supportive of computer use. Pertinent data are reported in Table 3.

Insert Table 3 about here

Objective 4

Correlation coefficients for variables used in the regression analysis are presented in Table 4 for informational purposes.

Insert Table 4 about here

The interpretation of the correlation coefficients is based on the set of descriptors by Hinkle, Wiersma and Jurs (1979): 00 to .30 -- little if any correlation; .30 to .50 -- low correlation; .50 to .70 -- moderate correlation; .70 to .90 -- high correlation; and .90 to 1.00 -- very high correlation. High correlation (-.731) was found between computer anxiety and teacher's level of computer skills. A moderate correlation (-.517) existed between computer anxiety and perceived typing skills. Formal computer training had a coefficient described as low (-.432).

Table 5 displays the results of the multiple regression analysis. A variable was included in the model if it contributed one percent or more of the explained variance. Teacher's level of computer skills was the best predictor of computer anxiety. Considered alone, this variable explained 53% of the

variance in the overall COMPAS score. Perceived typing skills explained an additional 2% of the variance in COMPAS score.

Insert Table 5 about here

Teachers with no or low levels of computer skills, and teachers who indicated they had poor typing skills, were more likely to have higher computer anxiety scores. Even though all 14 variables included in the stepwise multiple regression were chosen based on prior research or a theoretical/conceptual framework, only two variables accounted for a significant proportion of the variance in this study.

CONCLUSIONS

1. The distribution of the scores suggest that some secondary technical education teachers (46%) are experiencing some overall computer anxiety as classified by Oetting (1983) in the COMPAS manual.
2. No differences exist between the computer anxiety levels of male female secondary technical education teachers. This is supported by research done by Kotrlik and Smith (1988). This finding also contradict theory by Winkle and Matthews (1982) who suggested that women fear computers more than their male counterparts.
3. Over 45% of secondary technical education teachers in this study consider themselves to be either complete beginners or novices. This appeared to be associated with lack of sufficient training in the use of the computer.
4. The most frequent type of formal computer instruction was in-service training workshop(s). This is an indication that secondary technical education teachers in this study did receive some formal computer training.
5. The majority of the secondary technical education teachers perceived they have local and state administrative support for computer use.

6. The regression analysis revealed two significant explanatory variables. The two variables: teacher's level of computer skills and perceived typing skills explained a substantial proportion of the variance in teachers' overall COMPAS scores.

RECOMMENDATIONS

1. Vocational administrators should provide teachers with more opportunities to get "hands-on" experience with computers. This exposure could help to reduce teachers' computer anxiety levels.
2. Computer training for secondary technical education teachers should be relevant to their major program area(s). This will help to reduce fear and increase the desire to use the computer technology necessary for program delivery.
3. The two significant explanatory variables of computer anxiety should be considered when planning preservice and inservice activities for secondary technical education teachers.
4. Research should be conducted to evaluate the computer training provided by preservice and inservice education to secondary technical education teachers.

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Table 1

COMPAS Scores of Respondents for Overall Computer Anxiety (N = 116)

Computer anxiety levels[a]	Range[b]	f	%
Very anxious	37-50	22	19.00
Anxious/tense	33-36	8	7.00
Some mild anxiety present	27-32	23	20.00
Generally relaxed/comfortable	20-26	24	21.00
Very relaxed/confident	10-19	39	33.00
Total		116	100.00

[a] M = 25.61, SD = 10.84

[b] Range = 10-50. The ranges and categories for the COMPAS (short form) were 10-19, very relaxed/confident; 20-26, generally relaxed/comfortable; 27-32, some mild anxiety present; 33-36, anxious/tense; and 37-50, very anxious.

Table 2

Comparison of Computer Anxiety Levels of Secondary Technical Education Teachers by Sex

Scale	Male teachers (n = 68) Mean	S.D.	Female teachers (n = 48) Mean	S.D.	t
General computer anxiety	26.4	10.6	24.5	11.2	-.91

NOTE. Pooled variance estimate was used in this analysis. The general computer anxiety scale range is from 10 to 50.

Table 3

Respondents' Perceived Administrative Support of Computer Use (N = 114)

Statement	M	S.D.
Local administrator(s) support(s) use of computer	3.75	1.19
State administrator(s) support(s) use of computer	3.63	1.22

Table 4

Correlations Between COMPAS Scores and Variables Used in Regression Analysis (N = 116)

Variables	r	Strength of Correlations
Teacher's level of computer skills	-.731	High
Perceived typing skills	-.517	Moderate
Formal computer training	-.432	Low
Hours of computer use per week	-.340	Low
Perceived verbal ability	-.226	Little, if any
Major program area	.221	Little, if any
Local administrative support	-.180	Little, if any
Perceived mathematical ability	-.135	Little, if any
Location of school	.121	Little, if any
Age	.119	Little, if any
Education	-.109	Little, if any
Sex	.072	Little, if any
State administrative support	-.070	Little, if any
Teaching experience	-.053	Little, if any

Table 5

Multiple Regression of COMPAS Scores of Secondary Technical Education Teachers (N = 116)

Source of Variation	SS	df	MS	F-ratio	Prob. of F
Regression	7475.91	2	3737.95	69.95	.0000
Residual	6037.62	113	53.43		
Total	13513.53	115	3791.38		

Variables in the equation

Variables	Multiple R	R^2	F	Sign. F
Teacher's level of computer skills	.730	.533	72.41	.0000
Perceived typing skills	.141	.020	4.87	.0293

Note. Variables that were not significant explanatory variables were: major program area, education, teaching experience, age, sex, location of school, hours of computer use per week, formal computer training, local administrative support, state administrative support, perceived mathematical ability and perceived verbal ability.